WHAT IS CLAIMED IS:

1. A method of infusing a fluid into a body of a user, the method comprising:

obtaining a blood glucose concentration of the user;

generating a controller input based on the blood glucose concentration;

generating commands by a proportional plus, integral plus, derivative (PID) controller from the controller input using at least one preset controller gain; and

infusing a liquid based on the commands from the PID controller.

2. The method according to claim 1, wherein the blood glucose concentration is obtained through an IV catheter connected to the body of the user.

3. The method according to claim 2, wherein a vascular sensor is inserted through the IV catheter to be in contact with the blood and obtain the blood glucose concentration of the user.

4. The method according to claim 2, wherein an automatic blood withdrawal system is used to obtain the blood glucose concentration of the user.

5. The method according to claim 1, wherein the blood glucose concentration is obtained through a subcutaneous sensor in contact with interstitial fluid.

6. The method according to claim 1, wherein the blood glucose concentration is obtained by using a blood glucose meter.

7. The method according to claim 1, wherein the liquid is infused through an IV catheter connected to the body of the user.

8. The method according to claim 1, wherein the at least one preset controller gain is selected such that the commands generated by the PID controller infuses insulin into the body of the user in response to a glucose concentration at a rate similar to the rate that beta cells would release insulin in an individual with a healthy normally functioning pancreas.

9. The method according to claim 8, wherein the at least one preset controller gain is selected by a method that includes the step of measuring an insulin response of at least one individual with a healthy normally functioning pancreas and calculating the at least one controller gain that causes the commands to generally match the insulin response of the at least one individual.

10. The method according to claim 8, wherein the at least one preset controller gain includes at least one tuning parameter that further modifies the commands generated by the PID controller to create an insulin concentration profile that more closely resembles the insulin concentration profile that would be generated by the release of insulin by beta cells in an individual with a healthy normally functioning pancreas.

11. The method according to claim 10, wherein the at least one tuning parameter is an integrator leak.

12. The method according to claim 10, wherein the at least one tuning parameter is a lead/lag compensator.

13. The method according to claim 10, wherein the at least one tuning parameter is an integrator clip.

14. The method according to claim 10, wherein the at least one tuning parameter is a feedback of predicted plasma insulin.

15. The method according to claim 1, wherein the PID controller is a bilinear PID controller.

16. The method according to claim 15, wherein the bilinear PID controller accurately estimates a hypoglycemic glucose excursion.

17. A system for infusing a fluid into a body of a user, the system comprising:

means for obtaining a blood glucose concentration of the user;

means for generating a controller input based on the blood glucose concentration;

means for generating commands by a proportional plus, integral plus, derivative (PID) controller from the controller input using at least one preset controller gain; and

means for infusing a liquid based on the commands from the PID controller.

18. The system according to claim 17, wherein the blood glucose concentration is obtained through an IV catheter connected to the body of the user.

19. The system, according to claim 18, wherein a vascular sensor is inserted through the IV catheter to be in contact with the blood and obtain the blood glucose concentration of the user.

20. The system according to claim 18, wherein an automatic blood withdrawal system is used to obtain the blood glucose concentration of the user.

21. The system according to claim 17, wherein the blood glucose concentration is obtained through a subcutaneous sensor in contact with interstitial fluid.

22. The system according to claim 17, wherein the blood glucose concentration is obtained by using a blood glucose meter.

23. The system according to claim 17, wherein the liquid is infused through an IV catheter connected to the body of the user.

24. The system according to claim 17, wherein the at least one preset controller gain is selected such that the commands generated by the PID controller infuses insulin into the body of the user in response to a glucose concentration at a rate similar to the rate that beta cells would release insulin in an individual with a healthy normally functioning pancreas.

25. The system according to claim 24, wherein the at least one preset controller gain is selected by a method that includes the step of measuring an insulin response of at least one individual with a healthy normally functioning pancreas and calculating the at least one controller gain that causes the commands to generally match the insulin response of the at least one individual.

26. The system according to claim 24, wherein the at least one preset controller gain includes at least one tuning parameter that further modifies the commands generated by the PID controller to create an insulin concentration profile that more closely resembles the insulin concentration profile that would be generated by the release of insulin by beta cells in an individual with a healthy normally functioning pancreas.

27. The system according to claim 26, wherein the at least one tuning parameter is an integrator leak.

28. The system according to claim 26, wherein the at least one tuning parameter is a lead/lag compensator.

29. The system according to claim 26, wherein the at least one tuning parameter is an integrator clip.

30. The system according to claim 26, wherein the at least one tuning parameter is a feedback of predicted plasma insulin.

31. The system according to claim 17, wherein the PID controller is a bilinear PID controller.

32. The system according to claim 31, wherein the bilinear PID controller accurately estimates a hypoglycemic glucose excursion.